

## CLAIMS:

1. A method of encoding a multi-channel audio signal comprising at least two audio channels, the method comprising,
  - generating a single channel audio signal and encoding the single channel audio signal into a bit stream as an encoded single channel audio signal,
  - 5 generating information from the at least two audio channels allowing to recover with a required quality level the multi-channel audio signal from the single channel audio signal and the information, the generating of the information comprising,
    - determining a first portion of the information for a first frequency region of the multi-channel audio signal, and encoding the first portion of the information into the bit stream as an encoded first portion of the information, and
    - 10 determining a second portion of the information for a second frequency region of the multi-channel audio signal, the second frequency region being a portion of the first frequency region, and encoding the second portion of the information into the bit stream as an encoded second portion of the information.
- 15 2. A method of encoding a multi-channel audio signal comprising at least two audio channels, the method comprising,
  - generating a single channel audio signal,
  - generating information from the at least two audio channels allowing to
  - 20 recover with a required quality level the multi-channel audio signal from the single channel audio signal and the information, the generating of the information comprising,
    - receiving a maximum allowable bit rate of the encoded multi-channel audio signal, and
    - only determining a first portion of the information for a first frequency region
    - 25 of the multi-channel audio signal if a bit rate of the encoded multi-channel audio signal comprising the single channel audio signal and the first portion of the information is not higher than the maximum allowable bit rate.

3. A method of encoding as claimed in claim 1 or 2, wherein the single channel audio signal is a particular combination of the at least two audio channels.
4. A method of encoding as claimed in claim 1, characterized in that the information comprises sets of parameters, the first portion comprises at least a first one of the sets of parameters, the second portion comprises at least a second one of the sets of parameters, wherein each set of parameters is associated with a corresponding frequency region.
- 10 5. A method of encoding as claimed in claim 4, characterized in that the sets of parameters comprise at least one localization cue.
- 15 6. A method of encoding as claimed in claim 5, characterized in that the at least one localization cue is selected from: an interaural level difference, an interaural time or phase difference, or an interaural cross-correlation.
7. A method of encoding as claimed in claim 1 or 2, characterized in that the first frequency region covers a full bandwidth of the multi-channel audio signal.
- 20 8. A method of encoding as claimed in claim 1, characterized in that the first frequency region substantially covers a full bandwidth of the multi-channel audio signal, the second frequency region covers a portion of the full bandwidth, and in that the determining of the second portion of the information is adapted to determine sets of parameters for both the second frequency region and a set of further frequency regions, the second frequency region and the set of further frequency regions substantially covering the full bandwidth, where in the set of further frequency regions comprises at least one further frequency region.
- 25 9. A method of encoding as claimed in claim 8, characterized in that the single channel audio signal and the first portion of the information form a base layer of information which is always present in the encoded multi-channel audio signal, and in that the method comprises receiving a maximum allowable bit rate of the encoded multi-channel audio signal, the second portion of the information forming an enhancement layer of information which is encoded only if the bit rate of the encoded base layer and enhancement layer is not higher than the maximum allowable bit rate.

10. A method of encoding as claimed in claim 4, characterized in that the determining of the first portion of information in a particular frame of encoded information comprises determining the first one of the sets of parameters in the particular frame, and

5 coding the first one of the sets of parameters based on the first one of the sets of parameters of a frame preceding the particular frame.

11. A method of encoding as claimed in claim 8, characterized in that the determining of the second portion of information in a particular frame of the encoded

10 information comprises determining the sets of parameters of the second portion in the particular frame and coding the sets of parameters of the second portion in the particular frame based on the sets of parameters of a frame preceding the particular frame.

12. A method of encoding as claimed in claim 8, characterized in that the determining of the second portion of information in a particular frame of the encoded

15 information comprises determining the sets of parameters of the second portion in the particular frame and coding the sets of parameters of the second portion in the particular frame based on the first one of the sets of parameters of a frame preceding the particular frame.

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13. A method of encoding as claimed in any one of the claims 10 to 12, characterized in that the determining comprises calculating a difference between the corresponding parameters in the particular frame and the frame preceding the particular frame.

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14. An encoder for coding a multi-channel audio signal comprising at least two audio channels, the encoder comprising:

means for generating a single channel audio signal,

means for generating information from the at least two audio channels

30 allowing to recover with a required quality level the multi-channel audio signal from the single channel audio signal and the information, the generating of the information comprising,

means for determining a first portion of the information for a first frequency region of the multi-channel audio signal, and

means for determining a second portion of the information for a second frequency region of the multi-channel audio signal, the second frequency region being a portion of the first frequency region.

5 15. An encoder for encoding a multi-channel audio signal comprising at least two audio channels, the encoder comprising,  
means for generating a single channel audio signal,  
means for generating information from the at least two audio channels allowing to recover with a required quality level the multi-channel audio signal from the  
10 single channel audio signal and the information, the generating of the information comprising,  
means for receiving a maximum allowable bit rate of the encoded multi-channel audio signal, and  
means for only determining a first portion of the information for a first  
15 frequency region of the multi-channel audio signal if a bit rate of the encoded multi-channel audio signal comprising the single channel audio signal and the first portion of the information is not higher than the maximum allowable bit rate.

16. An apparatus for supplying an audio signal, the apparatus comprising:  
20 an input for receiving an audio signal,  
an encoder as claimed in claim 14 or 15 for encoding the audio signal to obtain an encoded audio signal, and  
an output for supplying the encoded audio signal.

25 17. An encoded audio signal comprising:  
a single channel audio signal,  
information from the at least two audio channels allowing to recover with a required quality level the multi-channel audio signal from the single channel audio signal and the information, the information comprising,  
30 a first portion of the information for a first frequency region of the multi-channel audio signal, and  
a second portion of the information for a second frequency region of the multi-channel audio signal, the second frequency region being a portion of the first frequency region.

18. A storage medium on which the encoded audio signal as claimed in claim 17 has been stored.

5 19. A method of decoding a multi-channel audio signal being encoded as claimed in claim 17, the method of decoding comprising:  
obtaining a decoded single channel audio signal,  
obtaining decoded information from the information allowing to recover the multi-channel audio signal from the decoded single channel audio signal and the decoded information, the decoded information comprises the first portion of the information and the second portion of the information, and  
applying either the first portion of the information or the first portion and the second portion of the information on the single channel audio signal to generate the decoded multi-channel audio signal.

15 20. A decoder for decoding an encoded audio signal, the decoder comprising:  
means for obtaining a decoded single channel audio signal,  
means for obtaining decoded information from the information allowing to recover the multi-channel audio signal from the decoded single channel audio signal and the decoded information, the decoded information comprises the first portion of the information and the second portion of the information, and  
means for applying the first portion of the information and the second portion of the information on the single channel audio signal to generate the decoded multi-channel audio signal.

25 21. An apparatus for supplying a decoded audio signal, the apparatus comprising:  
an input for receiving an encoded audio signal,  
a decoder as claimed in claim 20 for decoding the encoded audio signal to obtain a multi-channel output signal, and  
30 an output for supplying or reproducing the multi-channel output signal.